IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of

KADNER et al.

Appln. No.: 08/039,498 Group Art Unit: 1103

Filed: April 28, 1993 Examiner: G. Straub

Title: THE PROCESS FOR PRODUCING ALUMINUM OXIDE

* * * * *

August 16, 1995

REPLY BRIEF

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

Appellants submit herewith a Reply Brief in order to respond to entirely new points of argument in support of the rejections as now advanced in the Examiner's Answer (mailed June 16, 1995), as well as to correct fundamental errors therein which are likewise new to the record of this case.

(I.) GROUNDS OF REJECTION

The sole issue for review is whether claims 12 and 15-18 are obvious under 35 U.S.C. § 103 over Bezzi et al. in view of Takumi et al. or Sanchez et al., and further in view of Landis or DeHaven et al.

(II.) **ARGUMENTS**

In the Examiner's Answer, the Examiner has raised several new points of argument. Specifically, on page 8 of the Answer, the Examiner has argued for the first time that

> The production of spherical particles other than for nuclear free (uranium oxide) is clearly taught by Bezzi et al. who lists feeds such as catalysts, fluid beds.

Along these lines, on page 8, the Examiner has argued for the first time that

> From Bezzi et al., it would have been obvious to one of ordinary skill in the art to provide an individual gas supply to each of a plurality of individual droplet streams, [and] this of course would inherently provide a uniform gelling gas atmosphere.

Regarding the optimum bead shape, velocity, breaking strength and abrasion loss of Bezzi's particles, the Examiner has argued for the first time on page 9 that

> Since Bezzi et al. teaches reduction of deformation . . ., improved pre-gelling . . ., his product is also of uniform size and shape, has narrow grain size spectrum, has suitable porosity, high breaking strength and low abrasion loss particularly as compared to the prior art processes Bezzi et al. discusses.

In addition, on page 10, the Examiner has argued for the first time that the Bezzi reference teaches both interior and exterior reactive gas streams.

At the outset, Appellants note that these issues touch upon key aspects of novelty for the invention. Broad claim 16 specifically recites the following four features, among others:

1. aluminum oxide sol or aluminum oxide suspension having a viscosity of 10 to 500 mPa's;

2. aluminum oxide sol or aluminum oxide suspension dripped via nozzles disposed on a ring;

3. the nozzles are vibrated with a frequency of 10 Hz to 20000 Hz; and

4. the droplets generated by the nozzle ring are pre-solidified from the ring interior as well as from the ring exterior by blowing with ammonia gas.

These features of the invention result in the production of aluminum oxide bodies having an optimal bead shape with a narrow grain spectrum, an appropriate porosity, high breaking strength and low abrasion loss.

In order to produce the advantageous bead shape of the invention, it is necessary to pre-solidify the droplets just when they take the bead shape. To do this, a controlled circumferential blowing of ammonia gas against the beads is required. Otherwise, the gravity will cause the beads to reconvert into

droplets, and the finished product will not achieve optimum bead shape.

In order to clarify on the record how the claimed process produces aluminum oxide beads having the advantageous properties not exhibited by the beads produced by the prior art, Appellants have attached Figure A which is believed to help illustrate the advantageous of the claimed process. Figure A depicts a single nozzle whereby the penetrated solution first is shaped as a hairline interrupted at several throat regions before droplets are formed. Then, due to the existing cohesive strength, the droplets convert into beads. This is the moment pre-solidification should occur to avoid subsequent further change in the shape of the beads.

In the process of the invention, the dripping is accomplished by nozzles disposed on a ring. The nozzles can be arranged on rings which are coaxial to each other. If respective droplets were blown with ammonia gas only from the interior or only from the exterior, no uniform pre-solidification of all beads could be achieved since the beads would hide each other. Consequently, the droplets falling into the ammonia solution would differ in shape, depending on the extent of pre-solidification.

The attached Figure A also illustrates that in the claimed process the falling droplets do not spin and, in particular, do not rotate in any direction when they fall.

Consequently, blowing gas from one side, as suggested by Bezzi, cannot result in an uniform pre-solidification of the droplets. If uniform pre-solidification is lacking, it is impossible to achieve the desired bead shape.

In addition, Bezzi does not teach the production of aluminum oxide beads. Only from a retrospective view and from the information contained in the specification could someone conceivably interpret Bezzi such that production of aluminum oxide beads is possible. But even assuming arguendo that it was also obvious from Bezzi to drip aluminum oxide sol or suspension, the above-mentioned features 1-4 of the invention are completely missing form the disclosure of Bezzi. According to Bezzi, a uranyl nitrate solution is dripped via a single nozzle, and the falling droplets form a string. (See Claim 1 of Bezzi). This string of droplets is blown with a reactive gas from one side only. Due to this, no uniform pre-solidification can be achieved by Bezzi's process.

Landis and DeHaven teach a prilling method where an initial melt is sprayed and dried in a prill tower. Someone skilled in the art of this invention would not think to combine the sol gel method according of Bezzi with a prilling method, since both methods use completely different processes to produce granulates. In addition, the prilling methods of these secondary references completely lack pre-solidification of the beads and a

subsequent reactive solution into which the pre-solidified beads are deposited to complete solidification.

It is respectfully asserted that nothing more is required of Appellants than has already been proffered, both in the way of argument and data, to overcome these rejections.

For all the above reasons, and those already made of record, Appellants again respectfully submit that the present art rejections are not sustainable as a matter of law under § 103.

(III.) CONCLUSION

To summarize, it is submitted that each of claims 12 and 15-18 is patentable and free of obviousness from the prior art under 35 U.S.C. § 103.

Accordingly, the reversal of these rejections is respectfully requested.

Respectfully submitted,

CUSHMAN DARBY & CUSHMAN, L.L.P.

By _____

Kevin E. Joyce
Reg. No. 20,508
Tel: (202) 861-3050
Fax: (202) 822-0944

KEJ:MKC

1100 New York Avenue, N.W.
Ninth Floor
Washington, D.C. 20005-3918
(202) 861-30002

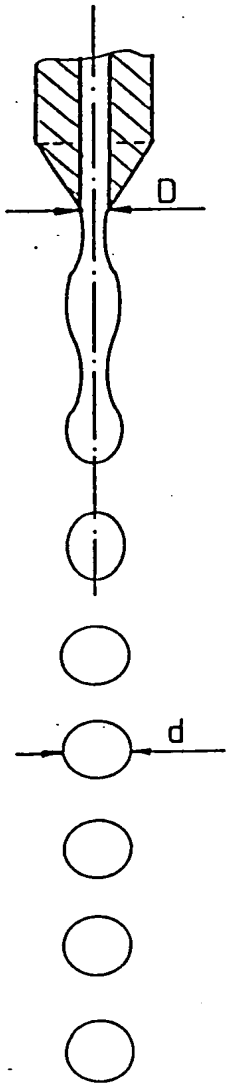

FIGURE A